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Khan, Nawaz, Lakshmi Sabih, Vijay, Georgiadou, Elli and Repanovich, Angela (2016) Big data to optimise product strategy in electronic industry. Proceedings of the International Conference on Advances in Big Data Analytics (ABDA 16) (2016 Worldcomp International Conference Proceedings). In: 3rd International Conference on Advances in Big Data Analytics, 25-28 July 2016, Las Vegas, USA. ISBN 9781601324276. [Conference or Workshop Item]

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Big Data to Optimise Product Strategy in the Electronics Industry

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Abstract - This research identifies the success factors for new product development and competitive advantage as well as argues how big data can expedite the process of launching a new product initiative. By combining the research findings and the patterns of background theories, an inquisitive framework for the new product development and competitive advantage is proposed. This model and framework is a prototype, which with the aid of scenario recommends the parsimonious and an unified way to elucidate the requisite of the market analysis, organizational potential and customer insights for product strategy and competitive advantage.

Keywords: product strategy, customer insights, market analysis, organizational potential, innovation.

1 Introduction

Transistor by transistor, the electronic industry is literally changing the universe. Companies whose core business revolves around the innovation of new products always relies on a strategy with an empirical research for its competitive advantage. In an epitome, leaders who win every quarter and every year, and decade after decade, in all environments, and against the best competitors are skilled at transferring their archetype and come up with product strategy which determines the direction of the new product [18]. In order to launch a new product in the marketplace a firm needs a well-planned product strategy and must be supported by large scale data that existed in the public domain.

1.1 Definition of Product Strategy

The encompassment of a product strategy is to assure the success of any organisation by executing specific tasks at a perfect time and it should acquire the significant purpose of the product [46]. This can only be achieved in today's world by adhering to big data and its analytics as it gives an opportunity to capture the decisions made by organisations about product within particular markets. Big data also can lead to the decisions of determining the improvement of products to satisfy market requirements and determine in which way to gain competitive advantage [45].

The sheer scale of big data and high frequency of mature data adding power to the product strategy development by combining decision with the management of the different levels of a product, product platforms, product lines and individual products [29]. The success of newly developed products can be measured in real-time due to the existence of the big data, i.e. 'now casting'. The product strategy idealises

the basis for executing a product roadmap and apparently the product releases [4]. However, a company is able to explicitly contemplate more on a segmented market explicitly and set features if they are properly aligned with the big data. The responsibility of product strategy is to make a superior relationship between the firm's product development and its product strategy [30]. McGarh and MacMillan [31] asserted that the firms and their products are plighted in the captured markets from a competence enhancing perspective. Gathering instant insights from digital big data is the resultant consequence of making imperative decisions in overseeing new product development [47].

The development and accomplishment of the product strategy takes place within an intricate market situation and success can be profoundly influenced by external artefacts (digital data about the competition, the economy, and even regulation); in this paper we propose a model for formulating a realistic product strategy that harnesses information and insights of big data and ensures collaborative innovation. Subsequently, this research is organised around questions :

- 1) Why some products win and some products fail the competitive advantage in the electronics industry?
- 2) Can the success factors for new product development and competitive advantage be achieved with the Big Data Analytics?
- 3) How can companies achieve competitive advantage?

2 Dimensions of Product Strategy

A product strategy focuses on forecasting at the growth stage of the product life cycle to ensure competitive advantage [28].

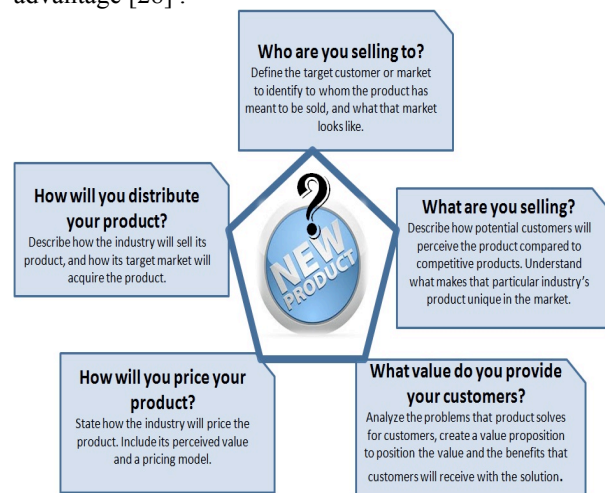


Figure 2.1: Strategic Questions-Element of product strategy

Figure 2.1 illustrates the challenges to new product development in the electronics industry.

While deriving a product strategy, the above factors as well as the process listed in the figure 2.2 has to be taken in account.

3 Background : Electronics Industry and Role of Big Data

The electronics world was not just the result of effort of some years or decades, it is rather the result of the hard work of great minds since ages, i.e. Moore's Law.

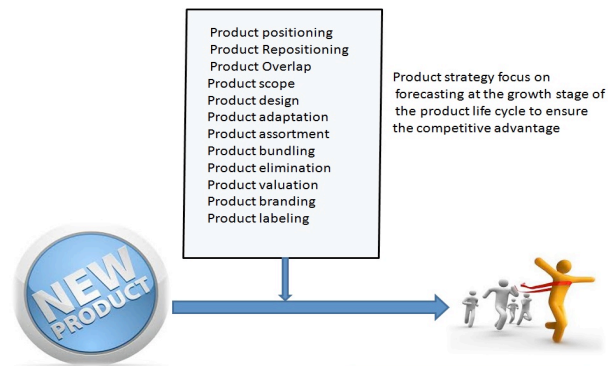


Figure 2.2: Forecasting Product Strategy

Innovation is the creative development of a particular product, service, idea, environment, or process with the ultimate goal of attracting customers and extracting value from its commercialization [39]. Decisive discrepancy must continue swiftly to avoid being overtaken by historically known competitors, as well as those who have yet to appear on the business radar [12]. The endurance of the company is highly implausible, if the rate of change outside the organization surpasses that inside the company, survival is highly unlikely [41]. In this decade, failure to address environmental pressures has brought thousands of companies to slash product augmentation programmes, reduce the size of the workforce, merge with other companies, or close down entirely. To subsist and succeed in the hypercompetitive global marketplace, corporations, therefore, must produce a steady stream of innovation [22]. Every enterprise is required to have a “channel” filled with upcoming innovation releases and must do everything within its power to abbreviate the time required for the development of new innovations.

3.1 Effect on Economy

The rapid increase in the efficient productivity in the electronics industry surpluses the economy which expanded the supply chain and moved the industry globally and has developed a future opportunities in the global economy[38]. Collaborative bodies such as the Materials Research Society continue to feature improvements and innovations [6]. Subsequently, the reduced cost of manufacturing and the increased consistency of new technology nodes have resulted in abundant improvement in the equity and operating profits of the semiconductor industry and, as a result, the electronics sector [26].

The in-depth implications of Moore's Law are seen in the growth of social media technologies and cloud computing , which require reinforced computing capabilities and are directly accountable for the demand for more elements on a single chip. The significance of this law is emphasized by the fact that it has caused a technological advancement and diaspora from microelectronics to nanoelectronics and fabricated an industry segment -- nanotechnology -- that is experiencing exponential growth. Regardless of reports that the law may be "slowing down," it remains the guiding law of the industry today [20]. From medical to transportation, from entertainment to adventures, communication to education and financial aspects all over electronics is the main tool behind the development [34]. The essence of development, especially in times of economic crisis, is innovation.

3.2 Advancement of Electronic Industry

Product innovation throughout the electronics industry has unfold into a highly maneuvered interdependence of technologies, materials, and design methods, modelling tools, and manufacturing process development. Organizations that launched superior high quality products such as Apple and Microsoft have been accredited with adopting the right product strategy for their products [20]. The quest for competitive advantage is already renovating the competitive landscape which will oblige companies to change the way they think about processes, technologies, products, and business models. That competitive advantage will stand them in good stead, because feasibility will always be an integral part of innovation and development [13].

3.3 Types of consumer electronics product

Figure 3.1 illustrates the types of consumer electronics in today's world. According to [36], miniaturization, convergence, digitization are the main factors that help in the growth of the electronic industry to come up with innovations with high value products and maintain competitive advantage.

3.4 Big data: Customer centric insights and innovations

Offering the right product to the right customer is what makes a business successful. The most ideal path for companies to achieve a competitive advantage is through innovation. Some product newness is better than no newness. According to [9], a marketing strategy supported by market insight characterises how a firm plans to compete in a preferred market research and the marketing strategy consists of the product strategy which helps to decide what the company wants to offer to the customers. Hence, product strategy is viewed as a core component of the overall marketing strategy. While formulating a marketing strategy, consumer insights and satisfaction is actually the main goal and a strategy that does not meet the needs of the consumers is a poor product strategy [40].

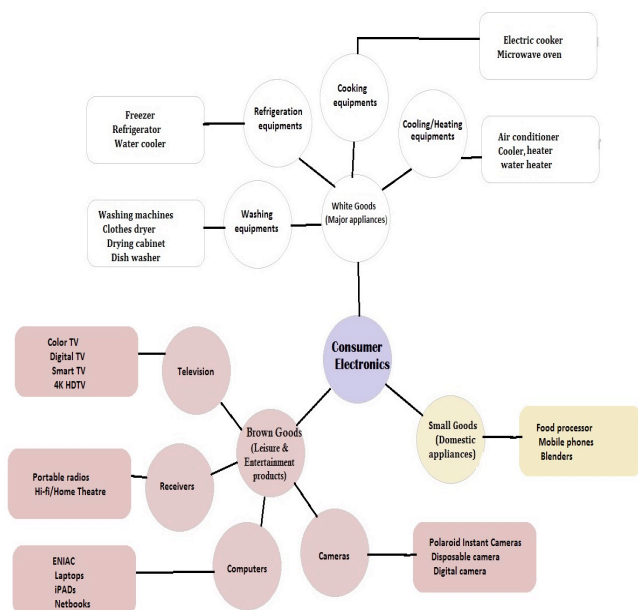


Figure 3.1: Types of consumer electronics types

Consequently, the association between product strategy and customer satisfaction have been a focal perception for both academics and practitioners, in perspective of the fact that repeat purchase tend to decrease [42].

Customer lifecycle [27] illustrates that in order to make a product success, it is vital to make the customer analytics persuasive across the life cycle of a product (Fig. 3.2).

Gundersen et al. [10] asserts that customer contentment is used up as an evaluative discernment about a particular product or service. In the core of marketing and product strategies customer satisfaction is essential. Therefore many companies are engaged to amend, assess and implement product strategies to increase customer gratification and upgrade share of customers in view of the positive outcome on the economic execution of the company. Angelova and Zekiri [1] point out that customer satisfaction is the outcome considered by consumers that have experienced a company's product strategy that have met their expectations. As part of business strategies, product strategies focus on the market, customer insights, customer satisfaction and their relations [43]. Furthermore the most significant purposes of building a Product strategy is to understand and increase customer satisfaction level which in turn take the firm to achieve competitive advantage.

4 Product strategy, Product Maturity, Competitive advantage

Without an appropriate implementation great strategies are nothing but simply void [35]. In simple words, better to implement efficiently a second class strategy than to

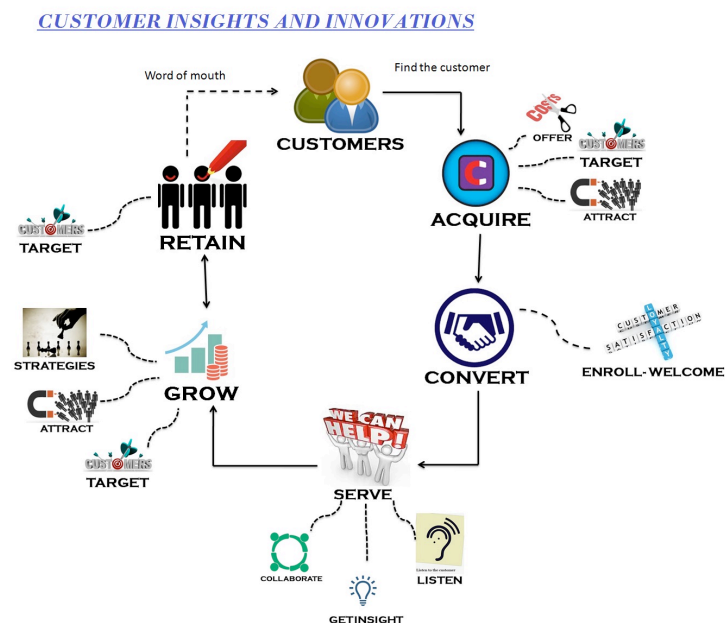


Figure 3.2: Customer centric innovation

devastate a first class strategy by unproductive implementation. Less than half of designed strategies get implemented and every breakdown in the execution/implementation is the breakdown of strategy formulation as suggested by [11],[32],[33]. For many of the electronic companies, creating/developing/inventing products are a focal point by which they adapt and sometimes even transform themselves in transforming the entire circumstances [50]. For example, Hewlett-Packard rehabilitated from an instruments company to a computer company through critical market analysis and new product development to achieve competitive advantage. Similarly, Intel transformed from a memory company to a microprocessor firm through product development [3]. Thus in the face of intense competitive advantage, a rapid technology advancement and customers' growing expectations, product innovation with a regulated critical market analysis and with a well-planned product strategy is the primary way in which firms actually adapt.

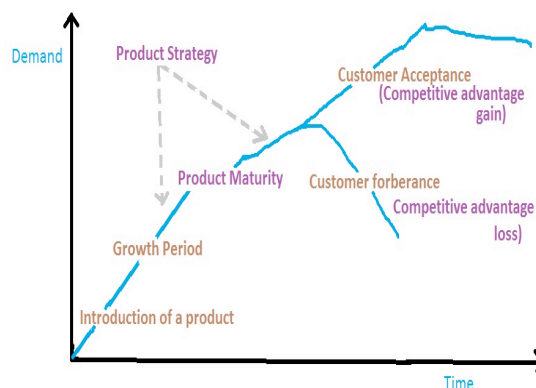


Fig: 4.1: Product strategy-Product Maturity and Competitive advantage

In recent years, fast adaptation has become a remarkable strategic competence for many organisations [7], [44]. Not surprisingly then, this similar theme of fast pace has become crucial in product innovation towards the competitive advantage. The insight, known as Moore's Law, became the outstanding principle for the electronics industry, and a driving paradigm for innovation. As a co-founder, Gordon developed the path for Intel to generate the best ever faster, smaller, more reasonably priced transistors that drive our modern tools and equipments. Even half a century later, the enduring impact and remuneration are felt in many ways [19].

4.1 Companies losing their edge

Most companies strive hard to innovate new products to be successful in the competitive market and the few that do find it daunting to stay there. The dissimilarities can be interpreted in relation to the unsuccessful situation and the final decisions can be drawn [4]. History has shown that software projects are highly likely to be successful if they are extremely focused and built upon well-understood reliable technology [14]. For example, [8] tells us that "projects are unsuccessful too often just because the project scope was not completely acceptable and/or user requirements are not fully understood." [17] Tells us that "MIS projects and related procurements take place in a circumstance characterized by the following: Weak management progression and an enticement system that motivates overly optimistic quotients of the benefits that can be achieved from doing the project." [24] Proclaims that the main reason for a failure of project is the highly because of the high user expectations. [16] Tells that because of the lack of alignment between IT departments and business users a project tend to fail.

4.2 Breakdown in Innovation Management

The Innovation management breakdown is considered the second most frequent cause of development progression: some continual issues in managing the internal business processes for validating existing current products and services and developing the new ones [2]. The innovation breakdown is attributed where the revenue growth stalls, the issues are definitely not centred on individual product launch failures; given that most large organisations depend on business models that have boomed to develop chronological product innovations, when things go off beam here—at the heart of these organisations' most vital business process—exceptionally serious, multiyear issues result [23].

5 Survey and Framework Design

5.1 Survey on Usability dimensions and Principles

The questionnaire was designed and hosted online using "Smart-Survey", which provides both free and paid online tools and services for designing and hosting the survey questionnaire online. 12 interviews were conducted and 225 survey data were collected to determine several factors that contribute to successful product strategy development. The 12 interviewee are from various electronic companies with over 10 years of working experience with various product

development departments and big data analytics. The aim of this research survey is to get the insight of the capability of big data in the electronic sector, product strategy development, and the competitive advantage from the company perspective. These factors are then collected and presented in the form of a framework.

5.2 Factors affecting successful product strategy

Failure of a product (Fig 5.1) is determined by various factors. These include: launching a product at the wrong time, no uniqueness or differentiation, poor marketing strategy, weak product positioning, misleading advertising, poor pricing strategy, weak product scope and design, flawed market analysis, insufficient quality, outdated technology, poor MDS (Marketed, Delivered, Serviced) and very weak product positioning.

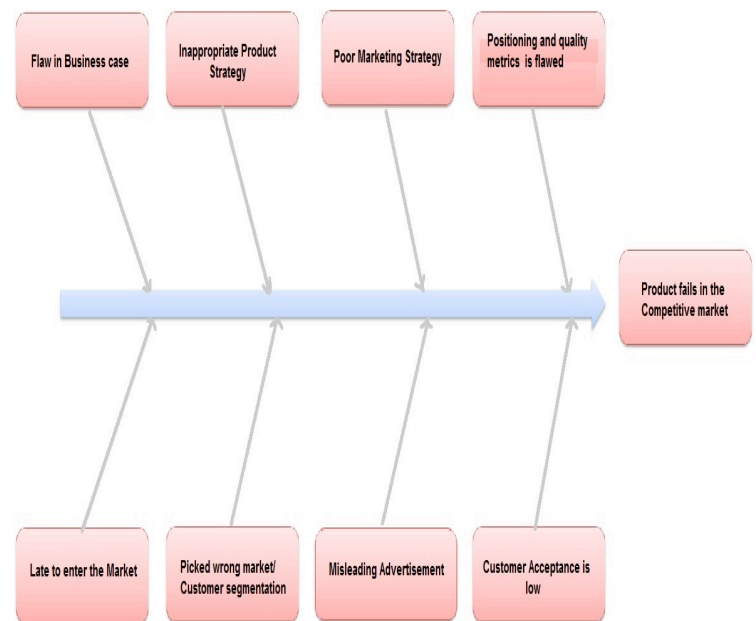


Figure 5.1: Reasons for product failure-Ishikawa diagram

The multiple convergent and the conceptual idea of parallel processing of products result in product failure [48].

Product differentiating strategy and cost leadership are the critical success factors for a product to master better competitiveness and achieve competitive advantage [37]. The objective of differentiation is to develop a position that potential customers see as unique.

5.3 Customer insights for deriving product strategy

Finding the customer touch-points from social analytics big data strategy. The list of customer touch points can vary depending on the business segment. Understanding the customer segments before and after product development as well as before, during and after purchase guides to know the customer touch-points. Formulating customer insights can happen with : 1. Gathering data (social media, transactional

systems, call records, marketing emails, service and support team) 2. Managing the data. 3. Converting the data into insights, 4. Translating insights into successful frontline action.

Knowing the customer lifecycle journey is vital and one of the critical success factors for a company to develop a new product to win the competitive advantage. A company can also analyse how effective the customer touch-points are for dynamic behaviour and moulding attitudes with respect to the touch-points of the competitors [22]. However, it must also be noted that all market segments are unique and hence, for example, Samsung cannot adopt a one size fits all strategy and instead, must approach each market differently. And hence Samsung derived its own product strategy- the Scattershot strategy.

5.4 Success factors for new product development and competitive advantage

Figure 5.2. shows the proposed categorisation of the identified success factors for new product development or product innovation and success factors for competitive advantage. Many researchers have acknowledged the critical success factors in product innovation. Here four main dimensions namely strategic, development (process) ,market, and organizational factors are presumed metrics to quantify the product level success resulting in competitive advantage.

Success factors	Strategic factors	Market factors	Process factors	Organizational factors
Success factors for New Product Development	Innovation strategy and competitive environment	Product Commercialization	Stage-gate process (milestones, checkpoints, stop/go decisions)	Good senior management
	Culture and behavior of Organization	Commercialization measured in terms of sales, distribution and promotion	Project methodologies (Total design,cycle-time excellence and phased development)	Organizational flexibility
	Product strategy portfolio management	Market analysis, Competitor analysis	Continuous assessment	Innovation management and Resources
	Investment in Research and Development	Customer integration and evaluation for robustness	Project management criteria (project efficiency, collaboration tools and communications)	Product champions (highly skilled and effective product development team)
Success factors for Competitive Advantage	Actual product performance (Robust, economic easy to use)	Market synergy/ uniqueness of product	New service development (after sales offerings)	Product differentiation and simultaneous development activities.
	Perception of product (Brand image, product positioning)	Customer insights	Invalidate customer research and competitors progress	Risk management
	Low cost operations (Considering location and buying power)	Product launch effectiveness	Cannibalization or Cross contamination to retain customers	Technology advancement
	Flexibility (Developing customized solutions)	Diagnose potential opportunities	LEAN thinking and sustainability	Change management/ adaptability

Figure 5.2: Success factors for product strategy

Cooper constructs the factors for new product performance NewProductDevelopment(NPD) in order of consequence as: NPD process, NPD strategy, organisation, and culture and management assurance. Cooper's ethics is Circumstantiated as being 'techno-centrism' in nature and declined to recognize the role of knowledge and other non-technical aspect of innovation [25]. The existence of new product development

strategy is undoubtedly considered as the most important sign of a successful new product development [5].

5.5 “4-Level Venn” Business Framework

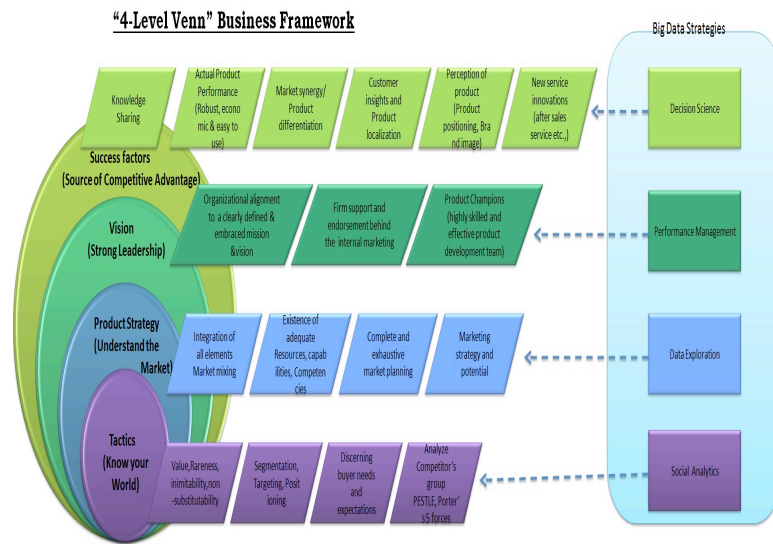


Figure 5.3: 4-Level Venn Product Strategy Framework

Figure 5.3 proposes the “4-Level Venn” product strategy framework. The figure shows the key areas to concentrate on ‘before’, ‘during’ and ‘after’ a product development. The key areas are derived incorporating big data strategies. This framework would evoke the possibility of a product to achieve competitive advantage where big data analytics plays a major role by identifying the market trends, hidden patterns, customer preferences, unknown correlations, and other useful business information. The big data is capable of measuring both the transactional and non-transactional data and involved in the derivation of the key factors for New Product Development. The type of innovation makes the differences in any product launch. When a product launch fails, it is not the product that fails but the management. It is important to be objective for a successful product launch. Today, big data is big business.

5.6 Stability Strategic Model

Fig.5.4 shows the proposed model which would be successful with the “4-Level Venn” business framework. A product developed with the ‘4-level Venn’ business framework, art of innovation along with consumer economics will result in a high quality product. That Ace product launched in market is highly likely to win the competitive advantage. This model can be implemented throughout the new product development but also during any upgrade, cannibalization, augmentation, cross-contamination of the existing product.

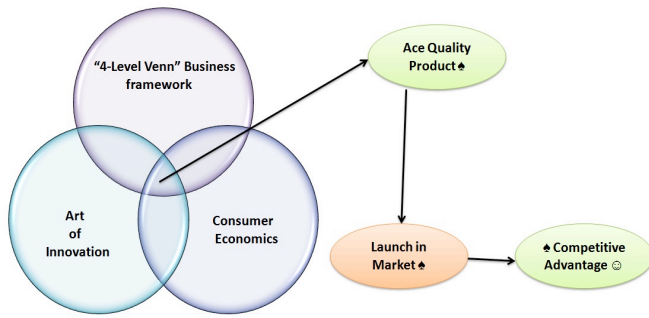


Figure 5.4: Stability Model

A successful business model results from its business level strategies that achieve a competitive advantage over rivals and generate superior performance in an industry [15].

6 Discussion

The article encompasses a detailed description of the product strategy and some other important elements that are linked to the subject matter. Also discussed how customer insight is a key factor for the new product development. Few examples are discussed for the success and failure product strategy. With the responses from the research findings, “4-Level Venn” business framework and Stability Strategic Model is proposed which is the profitable business model focuses on the various aspects of a product (planning, pre-launch and post-launch) to competitive advantage. The proposed model has been evaluated with a Scenario (Sony failed in competitive positioning). Though Sony was doing well in the market with all its new innovations and strong product champions, it failed to look around the work to maintain its competitive advantage. If Sony is to regain its competitive advantage, they need to get back to creating ace innovative products that consumers identify as unique and provides value. This could be attained by knowing its market position and competitors’ analysis. Consumers have much more choosing power and competition is fierce [49]. For aiming at the larger profit margins, Sony is suggested to forcefully concentrate on the business segments and strategies development as per the Stability Strategic Model. This would take advantage of their R&D department without waiting for individual consumers to come around to their product innovation. Along these lines, they should seek ways to incentivize their engineers to be exceptionally creative for growth hacking which would skyrocket the product, its value and differentiation than their competitors [16]. Hence the proposed model could be the profitable business model which further develops an appropriate strategy for Sony that allows being distinctive and regaining its competitive advantage.

This research also has analyzed how that strategy draws competitive advantage. The survey findings has certainly enlightened for the investigation of the success and failure factors of a product and why a company fall short to achieve competitive advantage as well as the success factors for competitive advantage. The research findings and the literatures from different sources been the guiding path to achieve the objectives in a well defined sequence of this thesis paper. The critical factors for the failure of the product has been concluded relating the internal (like strategies, resources,

organisational ability) and external factors (competitors, market analysis, current trends, customer insights) for the new product development.. To achieve competitive advantage any company should go on in an extra mile to capture the market, and hence the success factors for Competitive Advantage (CA) are drawn clearly. With respect to the research findings it is implicit that the vision of the company should be more strategic and is highly significant in overseeing the company’s objectives. Knowing the competitor is the first step in knowing the position of any company. Underestimating the competitor’s power is the first step towards losing CA. Customer insights; product differentiation and cost leadership are the most critical metrics to develop a product strategy roadmap which automatically leads to CA. While performing this research, it is undoubtedly nailed that product failure is not failure of a product rather failure of the management as a whole, which poorly perform the analysis of internal factors related to the existing market.

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